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INDEX TO CONTENTS

Editorials	39	The Possibilities of the Large Airplane	48
Value of Model Tests	43	Monthly Report of the Air Mail Service	51
Google Requirements	43	Women in the Aircraft Industry	52
Woolen Bureau Air Activities	44	Deputy for Gasoline	53
Aerial Forces, Poland—1920	45	Intercontinental Flying Association	54
Maurice G. Clergy	47	Aircraft Course at Columbia	54

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AVIATION AND AIRCRAFT JOURNAL

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No. 2

Vol. X

Aerial Lighthouses

THE Post Office Department is planning to place a series of lights between Chicago and Chicago and intermediate night flying between these points. This will be the first use of these devices in the country for that purpose and the experience gained will be of great value to American aviation.

Foreign countries have devoted considerable thought and money to the development of aerial lighthouses. The London-Fant survey is to be equipped with them in the near future. A point brought out by this foreign work is that the industry for the building of these lights steadily exists in the light house business.

Light houses have been used for centuries in maritime transportation to indicate dangerous localities and the entrance of harbors. They have usually been constructed by the various governments and have reached a very high degree of perfection and reliability. This accumulated experience will be of great value to aviation because it will eliminate a great deal of experimentation as the principal difference lies in the character of the beam. Light houses for aviation use indicate a course, a purpose maritime light houses seldom do.

This dual function in aviation will probably result in two types of lights being developed. One, a large light for use at air ports and the other an automatic or semi-automatic light for marking emergency landing fields and subsidiary aids to the course. The first type will very likely be similar to the light lighthouses now employed with the difference that the beam will be broader and directed upwards. The smaller type will be very similar to the type now employed on signal towers. Lights have been developed that are entirely automatic in their action and do not require attention more than once a year. Development along these lines will be watched during the coming year with the greatest interest.

Uncertainty in Wing Design

FOR quite a number of years the glider type of airplane was superior in almost all types of machines, irrespective of size or service. At the present moment, designers are experimenting with extremely broad wings, glider type of airplane construction with long unsupported spans, monoplane with rigid housing, internally braced monoplane with struts at the body to relieve the cantilever load and a number of other constructions.

Each type of construction seems to have its own advantages and defects. The glider type airplane certainly suffers from the disadvantages of wing interference and resistance in emergency landing. The extremely broad monoplane is comparatively clean, but its spans tend to be very long and it is liable to be very heavy. It is possible that the best compromise will finally be achieved in the way of internally braced monoplane with auxiliary bracing to relieve the heavy loads and lighten the weight per square foot of the wing structure.

Accidents Safe.

WHEN the men came from Canada that the three lost Navy aeroplanes had landed safely and were coming out of the Hudson Bay woods, there was general rejoicing from all parts of the country. Only when such happenings occur, is it realized that the public takes such an emotional interest in the welfare of our daring pilots.

Officers in service of the government also do the regular work required of them for years and on notice is taken of it, but they try some fight that has in it an effort to end previous achievements or an attempt to explore the unknown and their efforts are watched from coast to coast.

The flight of the Navy balloon in mid-winter toward the inaccessible regions of Canada was a daring exploit and one that many who know the perils of such an adventure might applaud. But it will again let the public know that our officers are ready to sail away into the night on experimental trips and not come down until they had reached the goal of their journey.

Fatigue and Durability.

ONE of the most important points in connection with the use of duralumin for airplane construction is the question of fatigue. Duralumin has been successfully used for many years in airplane construction and apparently no difficulties have been experienced from the point of vibration and fatigue. Duralumin however seldom has to meet the sudden and alternating stresses which an airplane has to undergo. Also in airplane construction stresses employed have generally been larger than would be the case in airplanes of moderate size.

Duralumin evidence as regards the resistance to fatigue of duralumin is therefore not entirely conclusive. Duralumin strips bent through 180 degrees in the classical manner of such tests do not show up as well as steel strips tested in the same way. Duralumin forgings on the other hand, have shown up better in fatigue tests than steel forgings. In neither case have the tests exhaustive and the evidence from these two lines of experimentation is somewhat meager to undertake a systematic investigation as to the fatigue properties of duralumin.

Gasoline Systems.

WHILE the attention of designers has been centered on perfecting gasoline systems for many years, there still seems to be much complexity in the design of such systems. Recently a gasoline system of a well known machine was responsible for two serious accidents. The system involved a main tank, gravity feed and an overflow return. While as simple as this type of system could be, it was complicated enough to cause trouble. By making the overflow return to the inlet side of the pump, removing the gravity return and applying a hand pump, it is understood that more than fifty per cent of the lines and accessories were removed, and much more satisfactory results were achieved.



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Value of Model Tests

By J. W. Magerolis

Former Director of the Eiffel Laboratory

The results given by aerodynamic laboratories have certainly produced the greatest service to aviation by stating the magnitude of the forces sustained by an airplane and its response to be obtained with fair precision.

It is considered, however, that the precision of the information given on the aerodynamic characteristics of models is no longer sufficient, and that at present there is rapidly required on the one hand, a program of comparison and revision and, on the other hand, scientific experimentation, which is in complete conformity to the progress of aviation, since aerobically more perfect and far-reaching tests than those hitherto required.

The influence on the outcome of results given by laboratories on the nature of the aerodynamic model, which will be emphasized first, then the influence of the nature of the dimensions of the model to those of the airplane and finally the influence of the nature of the tests and dimensions and of the speed of the apparatus on the dimensions and speed of the full scale machine. We shall also indicate what the aerodynamic laboratory may possibly be in the future.

Internal Structure of the Airframe of Wind Tunnels

When we compare the results of tests on the same models obtained in different laboratories, it is seen that very often these results do not agree, a few particularly striking examples of this fact are given below.

1.—The results of the aerial tests of the N.P.L. especially give better values than those obtained in the Eiffel Laboratory.

Having stated this fact, the Eiffel Laboratory itself has having a profile R.A.F. 14, 15, and 16, of dimensions 80 x 15 m. at speeds of 32 and 25 m/sec. the N.P.L. tests of these wings had been made on models of 50.7 x 7.6 m. at a speed of 12 m/sec.

A comparison of the values shows that those of the N.P.L. are better, not only with respect to the Eiffel Laboratory, values obtained at 12 m/sec. that is, for a gradient V_L twice as large, but also with respect to the Eiffel Laboratory, values obtained at 25 m/sec. that is, for a gradient V_L four times as large. During the war, this had a very important practical consequence for airplane construction to which the S.T.A. commented the tests on aerobically in the wind tunnel. The results obtained on the profiles tested in the N.P.L. were the better, while in practice, the difference arose either from error in measurement, or in the determination of speeds in one or the other of these laboratories.

2.—The Goettingen laboratory, comparing its results for tests of spheres with those obtained at the Eiffel Laboratory and at the St. Cyr laboratory, (the latter having conducted a series of experiments), found that the error values of the Eiffel Laboratory were much greater than those of the Eiffel and St. Cyr laboratories.

The Goettingen laboratory noticed that this difference arose from the internal structure of the air-stream, which is turbulent in the Eiffel and St. Cyr laboratories and laminar in the Goettingen. As a matter of fact, they say, if in their wind-tunnel they place a wire-mesh before the sphere, thus making the air-stream turbulent, they note immediately that the results of measured resistance approaches that obtained at the Eiffel and St. Cyr laboratories.

The difference between the internal structure of the fluid (medium) is different wind-tunnels is perhaps due to the following reasons: resistance induced inside by the flow, friction and which leads to the assumption that the mode of air-flow in a tunnel with open circuit is not the same as that in a tunnel with closed circuit.

It is difficult to state that there is formed in the walls of a gas with open circuit a zone of vortices whose number increases with distance from the entrance of the flow, and it is only at a certain distance from the entrance of the flow that the whole of the air-stream becomes turbulent and that the flow is similar to that of the air in a long tube.

But under these conditions we arrive at the conclusion that the air-stream is a closed current, the air in the walls of the tube, while in a wind-tunnel with open circuit, in which the working air-flow is free, the entrance of the collector and at which the air-stream is improved, the air-stream in the wind-tunnel would not be vortices.

We may remark that the conclusion is in formal contradiction to the opinion of the Goettingen laboratory given above on the turbulence of the air-stream in the open circuit wind-tunnel of the Eiffel laboratory and in their own closed air-stream.

In any case, the disagreement of test results may arise not only from error of experiment, but, what is much more serious, from the very mode of air-flow and those who believe the principle of relativity was not a priori, applicable to tests in an air-stream, but after a long time, some of it is possible to obtain, not only in different wind-tunnels, but even in the same wind-tunnel, different modes of air-flow and thus it is perhaps one such of these modes, or perhaps some of them, that the Eiffel Laboratory has obtained with a body moving in a turbulent air.

On the other hand, whatever be the mode of air-flow, in wind-tunnels with continuous walls pressure drag can never close the air-stream, due to the friction of the air on the walls and to the acceleration of the air recirculating in the wake of the model, which are particularly appreciable in models the resistance of stream-line bodies of rather extensive dimensions, measured parallel to the axis of the air-stream.

Thus, in certain cases, the resistance of a model, measurable in 20 per cent greater than the true resistance.

Pressure drag may be avoided in wind-tunnels with continuous walls by widening the section of the flow as was done by Dr. Prandtl in the first wind-tunnel with closed circuit at Goettingen.

In cases with interrupted walls the phenomena are different and we find a speed drag along the axis of the stream. These corrections are not yet regularly employed by all laboratories, for some do not agree with their credibility, and others have not been able to make them.

Because of these various discrepancies between different laboratories it would seem very important that laboratory staff should follow each other's work more closely.

Influence of the Relative Dimensions of the Airframe of the Model

It has just been shown that the want of precision in forecasting full scale results from model tests arises in the first place from the mode of air-flow in the wind-tunnel and that the laboratories are not yet agreed as to the legitimacy of the methods proposed for the correction of results in certain cases.

But besides these corrections, Dr. Prandtl has lately proposed another method of determining the results of model tests, based on the presence of model wings on an air-stream of fixed dimensions. Thus the model wing placed in a wind-tunnel of variable section, the author finds that the measured coefficient of induced resistance is

$$E' = E_0 \left(1 + \frac{p}{8K} \right)$$

where E_0 is the true coefficient of induced resistance, p , the span of the wing, and K the radius of the section of the air-stream. The term $\frac{p}{8K}$ is positive or negative according to whether the span of the flow is interrupted or continuous at the place of the working air-flow.

For $\frac{p}{8K} = 1$ (as usual case in laboratories), the difference between true and measured induced resistance reaches $\frac{1}{8}$ of the true resistance and the measured resistance in a flow with a true resistance of 40 per cent greater than this resistance measured in a wind-tunnel with continuous walls.

Influence of the Ratio of the Dimensions of the Model and Speed of the Flow to the Dimensions of the Full Scale Machine and Its Speed of Flight

In the early days of aviation, the laws of aerodynamics generally employed in practice from model tests to full scale machines were the law of similitude of the square of the speed and of the square of linear dimensions. No notice was taken of the relative values of the dimensions of the model and of the speed of the test with respect to the dimensions of the airplane and to its speed of flight.

Applied to aerodynamics as they were, and in view of the small dimensions of the first wind-tunnels and the low speed of flight of the first airplanes, the law of similitude of the square of the speed and of the square of linear dimensions was not applicable.

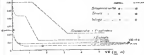


Fig. 1. COEFFICIENT OF RESISTANCE OF THE STREAM IN TERMS OF FUNCTION OF RATIO AND OF SPEED OF THE FLOW

of the streamlines, there have many times led to results totally different from full scale results.

Thus, great progress was made when it was perceived that, if the coefficients of resistance often vary as a function of the speed and dimensions of the model, they may nevertheless be considered as functions of $\frac{V}{D}$, namely that it is the product of the speed of the test and the principal dimensions of the model divided by the kinematic coefficient of viscosity.

When we consider the principal organ of an airplane, we note that they may be divided into two classes, according to their shape.

To the first group belong the bodies obtained by the translation of a section, such as the wing and struts of the main frame and landing gear and the wings of small aerobically. To the second group belong the bodies of aerobically, the fuselage, the tail, the wing, etc. when they are designated under the general name of stream-line bodies.

In regards stress, a general table of their aerodynamic characteristics may be drawn up as follows: let us be the surface area of the surface, that is, the ratio of depth to thickness D and V the product of the speed V in m/sec and the thickness D in m. If in each formula refers a term is placed at the coefficient of resistance R in the denominator of the fraction, the results of the experiments of the Eiffel Laboratory, are obtained.

In this figure a curve indicates the value of the coefficient of resistance R as a function of the ratio $\frac{V}{D}$ for a model of a fuselage with a speed of 15 m at a speed of 25 m/sec. These same values for the full scale airplane in horizontal flight near the ground at 80 m/sec. are indicated by a circle. For the streamlines with the values given from about $K = 0.80$ for the model to $K = 0.025$ for the airplane, that is, for the wing struts and landing gear parts from 0.80 to 0.025, but for the wings the coefficient remains constant.

Accordingly from 1925 at the Eiffel Laboratory testing aerobically models with the wings, struts, and landing gear parts, that is, with organs the resistance of which could be determined for full scale, was abandoned and from 1917 experiments which asked for tests of complete airplanes, and which were not possible to make, were abandoned, which could be better calculated. It was considered that the dimensions of the fuselage and struts were sufficient and that there was no need to apply corrections, and this could have been applied to the fuselage and struts.

At the present time, if it is desired to make a proper test of a model airplane, a model comprising only the wings and the

fuselage must be tested. It is thus assumed that the sum of the resistance and lift of airplane organs tested separately may be taken. Such, in fact, is the divided opinion of the aerodynamic laboratories, the Eiffel Laboratory, Goettingen for Aerodynamics for the purpose of studying the question of the accuracy of model tests. Recent experiments at the Eiffel Laboratory do not always confirm this opinion.

In any case, in the tests of models, it is impossible to take into account the interactions of the various parts of an airplane.

There exist very few precise comparisons of results of model tests and of full scale tests. First because in model tests the conditions selected have not been exactly followed by and also because the resistance of an airplane is not defined with sufficient accuracy, for want of direct measurements.

The results acquired by tests, however, seemed the scale on a chart, for high lift relative laboratory results are really lower than the results given by full scale airplanes.

Therefore, larger wind-tunnels should be made, but then the objection is met of the greater cost of models, not only because of their increased dimensions, but also of the greater cost required in working out their details, especially if the work of the propeller, a question of the greatest importance at the present time, is taken into account.

Under these circumstances there is only one course to take, and that is to create an installation where full scale airplane can be tested, that is, a wind-tunnel with a diameter of 5 or 6 m at a speed of 50 m/sec. and from 1500 to 1550 hp.

Very great importance is to be attached to the question of it is necessary to arrive in such a laboratory the speeds of 300 km/hr which will doubt be reached by airplanes. A special device, relieving the deficit of the working medium, should be installed in a position where the speed of the air is not so necessary to arrive in such a laboratory the speeds of 300 km/hr which will doubt be reached by airplanes.

The aim of this laboratory should not be to make rapid and comprehensive tests of small models with a view to obtaining an approximate forecast of the results to be expected from a new airplane. For model tests, the present aerodynamic laboratories.

The aim of the large laboratory which we suggest should consist in accurately determining the forces sustained by existing airplanes of modern type, those who cannot fit the conditions of real flight, by comparison of the various results already reduced, to a systematic assessment of air planes.

As a matter of fact, it often happens that under airplanes given, different results, without one knowing what causes the superiority of one plane over the other. As an example of this may be mentioned the tests carried out during the war by the French S.T.A. on the D.H. 50, the D.H. 50A, the D.H. 50B, the D.H. 50C, the D.H. 50D, the D.H. 50E, the D.H. 50F, the D.H. 50G, the D.H. 50H, the D.H. 50I, the D.H. 50J, the D.H. 50K, the D.H. 50L, the D.H. 50M, the D.H. 50N, the D.H. 50O, the D.H. 50P, the D.H. 50Q, the D.H. 50R, the D.H. 50S, the D.H. 50T, the D.H. 50U, the D.H. 50V, the D.H. 50W, the D.H. 50X, the D.H. 50Y, the D.H. 50Z, the D.H. 50A, the D.H. 50B, the D.H. 50C, the D.H. 50D, the D.H. 50E, the D.H. 50F, the D.H. 50G, the D.H. 50H, the D.H. 50I, the D.H. 50J, the D.H. 50K, the D.H. 50L, the D.H. 50M, the D.H. 50N, the D.H. 50O, the D.H. 50P, the D.H. 50Q, the D.H. 50R, the D.H. 50S, the D.H. 50T, the D.H. 50U, the D.H. 50V, the D.H. 50W, the D.H. 50X, the D.H. 50Y, the D.H. 50Z, the D.H. 50A, the D.H. 50B, the D.H. 50C, the D.H. 50D, the D.H. 50E, the D.H. 50F, the D.H. 50G, the D.H. 50H, the D.H. 50I, the D.H. 50J, the D.H. 50K, the 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for cleaning, or for replacement when new lenses are needed. The lens which carries the goggles should have small compartments for holding extra sets of lenses. Everything about the goggles should be simple proof.

Provision of glasses. Sufficient covering should be constructed with the goggles, or supplied in such a way that it might be quickly fitted to the goggles in order to protect the lenses from the wind. The cold of high altitudes seems great part of the trouble.

Provision. Some indirect method of ventilating is most important to prevent steaming up the goggles and frosture at high altitudes. The heat and moisture from the face will cause fogging rapidly unless there is a properly constructed ventilating system to carry the outside air to the posterior surface of the lenses. In this connection, Maj. Schroeder's account of his altitude record flight is very interesting. "While still climbing at large altitudes, I was somewhat surprised to find the temperature at the altitude (I was then more than 35,000 feet) was 3° below zero C. I believe that if my goggles had been better ventilated, they would not have fogged. When I was about 37,000 feet I had to leave my goggles. The cold air ran up my nose, water, and I was compelled to fly with my hand well down inside the goggles."

Fogging. Some chemical substance should be more perfectly developed for applying to the lenses before flight in order to

prevent frosting. The following words of Maj. Schroeder are very suggestive, "I gazed about through the small opening of my goggles which had as frost—due to a drop of oil which had leaked on them from the motor."

Fuel. When a fuel is required, it should allow the maximum vision, be tested to the eye, and not allow other vision seriously.

Provision Construction. The question of supplying the aviator with well-constructed goggles and with property ground lenses (where necessary) for essential wear in flying is an important one and our experience in France demonstrated how inadequate the facilities were for providing proper goggles and lenses.

In order that the best goggles may be obtained, the which matter should be placed in the hands of a committee composed of an experienced pilot, an ophthalmologist, a physicist, and a skilled mechanic. This committee should draw up the specifications, pass upon the samples presented, and they should have power to accept, or to reject if necessary, the finished product.

Desires the task of was this plan was not feasible. But the great future of military and commercial aviation calls for a thoroughly efficient goggles which, so far, has not been produced. Now is the time for carrying out this plan—while the shortcomings of the present goggles are still vividly a

Weather Bureau Air Activities

The report of the Chief of the Weather Bureau for the final year contains much material of interest to aviators. The special aviation section sent to the Air Service are given particular attention.

Army and Navy Balloon Race.—This race was confined to officers of the Army and Navy, three balloons being entered from each of these branches of the service. It was scheduled to start at 4 p. m. September 25, 1930, and complete arrangements were made to furnish not only forecasts at surface and aloft, but also to make observations aloft. The balloons were also weather photographs taken at the surface and aloft. Temporary headquarters were located at the starting grounds and telegraphic and telephonic communication established directly with the St. Louis office of the Weather Bureau. Each contestant was supplied with the observations, forecasts, and of advance without delay. The information furnished was of pronounced value and the forecasts were accurate to a remarkable degree.

Forecasting Tour of Navy Douglas NC-4.—The naval flying boat NC-4 began its pioneering trip from Rockwood Beach, Long Island, the latter part of September, the first part being a return trip to Atlantic City, thence to Portland, Me., from which place the route extended down the coast to the Florida straits, thence over the Gulf of Mexico to Pensacola and New Orleans, over the Mississippi and Ohio rivers as far as St. Louis and Cincinnati, back upon to the Gulf, and westward to San Francisco. During the course of this several months' trip, the Weather Bureau furnished a. m. and p. m. forecasts of weather and wind direction and velocity, both at the surface and aloft, for the aviation zone in which the boat happened to be at the time.

National Balloon Race.—This race was scheduled to start from St. Louis, Mo., at 4 p. m. October 1, 1931. A special message was sent that morning stating that there would be no race that day, due to unfavorable conditions. The race was held that night and the following day, and that the conditions would not be favorable for free ballooning. A second forecast, based on special observations, was sent at 2:30 p. m. advising that the race be postponed until the following day. The race was then held over the Great Lakes, where squalls and thunderstorms would be experienced. Notwithstanding this advice, the race was started at the appointed time. The contestants, 16 in number, were required to pass at least 10,000 feet. The observations, and generally unfavorable weather occurred. One of the balloons, with the two occupants, was lost in Lake Huron.

Forecasting Airship Airship Race.—This race was confined to aviators of the United States Army. Several points were San Francisco, Calif. and Honolulu, H. I., the course being a round trip between the two points. It began October 7 and ended October 21, 1930. Special forecasts were prepared for the benefit of the contestants each morning and evening during the course period. For this purpose the race was divided into seven zones, and a separate prediction of weather that would be encountered was issued for each zone and for the entire distance. These forecasts were of great assistance to the fliers. The race was won by Lt. Col. John W. Hayward. In commenting on the race the official news bulletin of the Air Service said:

“Lt. Col. Hayward's wonderful race was due to the fact that he took advantage of the splendid service rendered by the Weather Bureau in sending the weather forecasts to all of the contest ships. If he had had claimed that the weather would be bad for the next control stop, he would immediately take off and get to this stop before the storm had approached. This enabled him to gain a distinct advantage over the other participants at the very outset of the race.”

Flight-Weather Forecasts.—A new form of forecasts, known as “Flying Weather,” was begun in July, 1930, at the request of the War Department, for the especial benefit of the Air Service of the United States. The results of the six 7 zones were a separate forecast made for each of them in the a. m. and certain of the eastern zone in the p. m. Later the number of zones was increased to 13. These forecasts are telegraphed directly to the Air Service, which distributes them to the field. A typical forecast, which will explain their character, is as follows:

“From 10 a. m. to 3 p. m. fair weather; light. Good transmittance probable; conditions to turn much less favorable before noon, becoming cloudy and becoming clear, 3:00 p. m.”

Similar service has been furnished the Post Office Department on an ad hoc basis since aviation rates since the aerial mail system was inaugurated. It is likely that arrangements will be made for supplying weather information for the postal route service of the Navy. There is much demand for aerial navigation forecasts, and the Air Service is endeavoring to make such forecasts and forecasts are destined to become of as much importance to navigators of the air as to navigators of the sea.

Aerial Forest Fire Patrol-1920

Extracts from Report of Major H. H. Arnold

The Aerial Forest Fire Patrol for the season of 1920 started when personnel of the Ninth Aero Squadron were moved from Mater Field to Fresno and Red Bluff on May 30, 1920. The patroling was to conform to the routes outlined in the accompanying map, and was to cover the state

daily, beginning operations on July 1, according to schedule. Major stations were established at the following places on the dates indicated, the really personnel for the ground stations, together with the aerial corps meeting was, (No. 10-14) being sent out from the Fronts of San Francisco by



PACIFIC COAST AERIAL FOREST PATROLS

of California in accordance with patrol routes as indicated below:

Patrol No. 1—From Marsh Field to Rockwell Field and return.

Patrol No. 2—From Marsh Field to Santa Barbara and return.

Patrol No. 3—From Fresno to Bakersfield and return.

Patrol No. 4—From Fresno to Coalinga and return.

Patrol No. 5—From Marsh Field to Coalinga and return.

Patrol No. 6—From Marsh Field to Red Bluff and return.

Patrol No. 7—From Red Bluff to Alameda and return.

Patrol No. 8—From Red Bluff to Modesto and return.

Patrol No. 9—From Red Bluff to Corvallis and return.

Notes: The personnel for Patrols No. 1 and No. 2 was furnished by Marsh Field.

Early in the season it became apparent that the only Air Service troops available for this work would be those from the two squadrons on duty in the Ninth Corps Area, namely, the Ninth and Twenty-first. Accordingly, plans were laid out to patrol only the forests in the State of California, as this state has the longest dry season and consequently, the greatest need for fire patrol.

However, about the middle of May, conditions in Oregon became such that, after a consultation between the Governor of the State of Oregon, the District Forester of the Ninth Forestry District, the State Forester of the State of Oregon, and the Air Office of the Ninth Corps Area, plans were completed whereby patrols would start in Oregon about July 1st.

Flight of the Ninth Air Squadron was, therefore, taken from border patrol and sent to Oregon for forest patrol

and to make a survey of the forests in Oregon, with the exception of the stations in Oregon, to which planes and transportation was furnished.

Year of Station
Marsh Field, Calif.
Fresno, Calif.
Red Bluff, Calif.
Alameda, Calif.
Modesto, Calif.
Santa Barbara, Calif.
Rockwell Field, Calif.
Red Bluff, Calif.
Corvallis, Ore.
Eugene, Ore.
Medford, Ore.
Portland, Ore.

Established Date
Established between May 30 and May 15
Established between June 15 and June 15
Established approximately June 15

Notes
The routes as outlined contemplated a pilot's flying from the base to the up-base in about two hours, which, together with the return trip, would make about four hours in the air. By later in the season, for each patrol, it was thought that each pilot would in this way have two days off for each day of flying. This was considered the maximum amount of flying which could be required of the pilot, due to the fact that the country over which flights were made was exceedingly rough, emergency landing fields were few and far between and in almost every instance where an emergency, or forced landing was made a complete wreck resulted.

Later in the season, due to the shortage of personnel, it was found necessary to combine patrols Nos. 4 and 5 (from

The Intercollegiate Flying Association

The Intercollegiate Flying Association was formed in December, 1929, by representatives from the Aero Clubs of five colleges, for the purpose of maintaining and building up the spirit and interest of aviation among college men, and for the building together of these forces into a unified, organized body. The purpose is to establish and maintain serious flying clubs in every college in the United States, in order that aviation may keep in touch with aviation and is able to build up the interest among future college men.

The idea of such a federation was first developed by the Harvard Aeronautical Society and, after the plan of clubs as above set had been referred to several representative authorities for verification, invitations were sent to the Aero Clubs in aid of the student organization to meet for consultation in New York on December 20 and 31, 1929. On these days, delegates representing Columbia, Harvard, Princeton, Williams, and Yale met, discussed policies of organization, and on December 31, 1929, formed the Intercollegiate Flying Association. The constitution and by-laws were adopted and officers were elected.

During the meetings which followed throughout the spring of 1930, Cornell, Rutgers, Wesleyan, Lafayette, Princeton and Pennsylvania were added to membership. The charter membership was closed and plans were drawn up for the first annual meet to be held on May 7, 1930.

The officers of the association for 1930-31 are: President, Meredith H. Pyne of Princeton; The Ivy Club, Princeton, N. J.; vice-president, R. E. Kallen of Harvard; T. Royal B. L. Chandler, Mass.; secretary, Robert A. Goss of Columbia; John Van Dine, Columbia University, New York; treasurer, Loren Danner of Pittsburgh, 3001 Terrace Street, Pittsburgh, Pa.

The first annual meet last May was a success and the events held were: "Motorizing" and aerobics, take-offs and landings to merit, short competition and a cross-country race.

The trophies awarded and their winners were: American Flying Club Trophy—To go to the club scoring the highest number of points in the meet; Yale Aero Club trophy of Massachusetts Trophy—To go to the club winning the cross-country race; Wan by Yale; Cleveland Aviation Club Trophy—To go to the club scoring highest in events 1, 3 and 4; Won by Columbia.

An attractive booklet giving the items of application for membership and the constitution has been prepared and may be obtained by addressing the secretary.

England-Norway Airway Planned

Plans are under way for the inauguration of an air service between England and Norway, by way of Iceland and the Azores. A two-stage service for the winter months and a daily service for the summer. The Metropolitan of Christian states that an Anglo-Norwegian air traffic company has been formed at a capitalization of 300,000 kroner, of which 200,000 kroner will be raised in England.

The company, according to this newspaper, has already acquired a Handley Page machine with accommodations for ten passengers and two pilots. Tests between Greenland and London will be conducted in the next few days, and in the meantime, if the tests prove the venture a success, four more planes will be purchased and a regular service opened.

The service between Bergen and Stavanger, recently opened, states The Metropolitan, has been a failure, despite very agreeable weather. Five hydroplanes are used in this service of English make and two German. Eighteen passengers are carried on each trip and a large quantity of mail sent.

Mexican Air Organization

The Secretary of Communications and Public Works of Mexico has created a new department known as Technical Aviation to study all matters of official and commercial aviation. Juan Guerrero Villanueva who has been appointed head of this department has special qualifications for this office, as in the past administration he occupied the position of Director of the Bureau of Aeronautical Construction.

Aircraft Course at Columbia

At Columbia University, New York, there will be given on Monday evening, beginning February 7, by Frank E. McKee of the Massachusetts Institute of Technology a series of lectures on "An Elementary Study of Air Navigation Problems and Aircraft."

In this course some of the fundamental principles of several important elements entering into the employment of aircraft both for war and also for special commercial purposes will receive major consideration. Engineering accomplishments and problems awaiting solution will be described. Possibly lantern slides and illustrative matter of various sorts will be used.

The course will appeal to those who desire to understand and to take some part in this new industry. Some of the topics that will receive consideration are:

I. Present, necessary requirements of aircraft; military and naval requirements of aircraft; postal department requirements of aircraft; private employment of aircraft; aircraft industries.

II. Nomenclature: airplane, aeroplane, propeller, motorship, motor vehicle, locomotion by air, automobile, pontoonship.

III. Aircraft, heavier than air, principles of construction, types of airplanes, construction of airplanes, characteristics of typical airplanes.

IV. Aircraft, lighter than air; principles of construction, rigid airships, non-rigid airships, construction of airships.

V. Aircraft engine, principles of the gas engine, the water-cooled gas engine.

VI. Meteorology: properties of the atmosphere, storms, weather forecasting, instruments.

Naval Aviation in South America

The Navy Department has received an interesting report from the U. S. Naval Air Station at Casa Grande, Brazil, concerning the activities of the business side of South America, as shown in aviation. The report states that the various long distance flights made from the air stations by Navy airplanes have attracted with attention, and numerous requests to visit cruise parties in South America are being received.

The first long distance flight made from Casa Grande was to Port Elmore and return, a distance of 400 miles. Port Elmore, broadcasted by radio the start of the planes, and the flight kept in touch by radio with the shore stations and ships all along the route. Communication with the aircraft was thus maintained throughout the trip.

Flying Boat Mail Service in Philippines

The Bureau of Insular Affairs, War Department, has proposed for the Philippine government, from the Navy Department, the P-5-L and three HB-2-L flying boats with four engines. Liberty engines and a number of spare parts. The equipment will be used to establish an aerial mail and passenger service between Manila and the other large towns of the Philippines.

The flying boats, owned by the Philippine National Guard officers who have been in training for about six months in a school conducted for that purpose by the Curtis company under a contract with the Philippine government. The equipment shipped to the Philippines and upon arrival there they will be converted for the mail and passenger service. The P-5-L type has four engines and the HB-2-L on passenger. It is expected that the P-5-L will carry mail and passenger service will be inaugurated early this year.

Graduates from Air Service Mechanics School

During the month of October, one hundred and two students were graduated from the Air Service Mechanics School at Kelly Field. Fifty-eight were graduated from the course for Kelly Field; fifty-eight were graduated from the course for regular mechanics. Fifty from the course for airplane mechanics and parachute equipment; five from the course for parachute equipment; fourteen from the course for airplane mechanics; and ten from the course for auto mechanics. At the completion of their work, these men were sent to stations different Air Service stations in the United States.



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Based on the basis of miles-per-hour to cubic inch capacity the result of the race proves that the winner had but four-fourths of the displacement of the Wright-powered Thomas-Morse entry.

Again in one of the other classes, the Navy

entry (a Vought) powered with a Wright Model E motor of 700 cubic inch capacity recorded an extraordinary speed of 145 miles per hour, or at the rate of 1900 miles per hour per cubic inch displacement, while the larger plane, from which the Vought was obtained but 1000 miles per hour per cubic inch displacement. One of the most remarkable showings made in aeronautical engine design.

Had this race been conducted according to the methods employed in automobile races where engine displacement is limited in the various classes, Wright Aeromarine Engines would have swept the Pulitzer Race events from start to finish.

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REPORT Serial No. 446

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INDEX TO ADVERTISERS

A		
Aeromarine Plane & Motor Co.	54	
Aircraft Service Directory	58	
Aviation Co. of America	57	
B		
Baker Castor Oil Co.	57	
Baker, Frederick W.	58	
Beverly-Graham Corp.	55	
C		
Curtis Aeroplane & Motor Corp.	59	
D		
Dapton Wright Co.	58	
E		
Edstrom Machinery Co.	56	
F		
Fletchery Mfg. Co.	56	
G		
Grand Rapids Veneer Works	59	
H		
Hall-Smith Motor Car Co.	58	
Home Insurance Co.	58	
Howard, Raymond H.	58	
I		
Intero, The Glass L. Co.	58	
N		
Norfolk Aircraft Corp.	58	
P		
Philadelphian Aero-Service Corp.	58	
Process Enrichment Co.	58	
T		
Thomas-Morse Aircraft Corp.	58	
W		
Wallington Bros. & Co.	58	
Wissman-Lewis Aircraft Corp.	57	
Wright Aeronautical Corp.	58	

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